

Estimation of Reduced Rank Regression

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Abstract:

In the regression model $\mathbf{Y} = \mathbf{B}\mathbf{X} + \mathbf{Z}$ with \mathbf{Z} unobserved, $\mathcal{E}\mathbf{Z} = \mathbf{0}$, and $\mathcal{E}\mathbf{Z}\mathbf{Z} = \boldsymbol{\Sigma}_{ZZ}$, the least squares estimator of \mathbf{B} is $\hat{\mathbf{B}} = \mathbf{S}_{YX}\mathbf{S}_{XX}^{-1}$. If the rank of \mathbf{B} is known to be k less than the dimensions of \mathbf{Y} and \mathbf{X} , the reduced rank regression estimator of \mathbf{B} , say $\hat{\mathbf{B}}_k$, depends on the first k canonical variates of \mathbf{Y} and \mathbf{X} (Anderson 1951a). The limiting distribution of $\hat{\mathbf{B}}_k$ is obtained and compared with the limiting distribution of $\hat{\mathbf{B}}$. The advantage of $\hat{\mathbf{B}}_k$ is characterized.